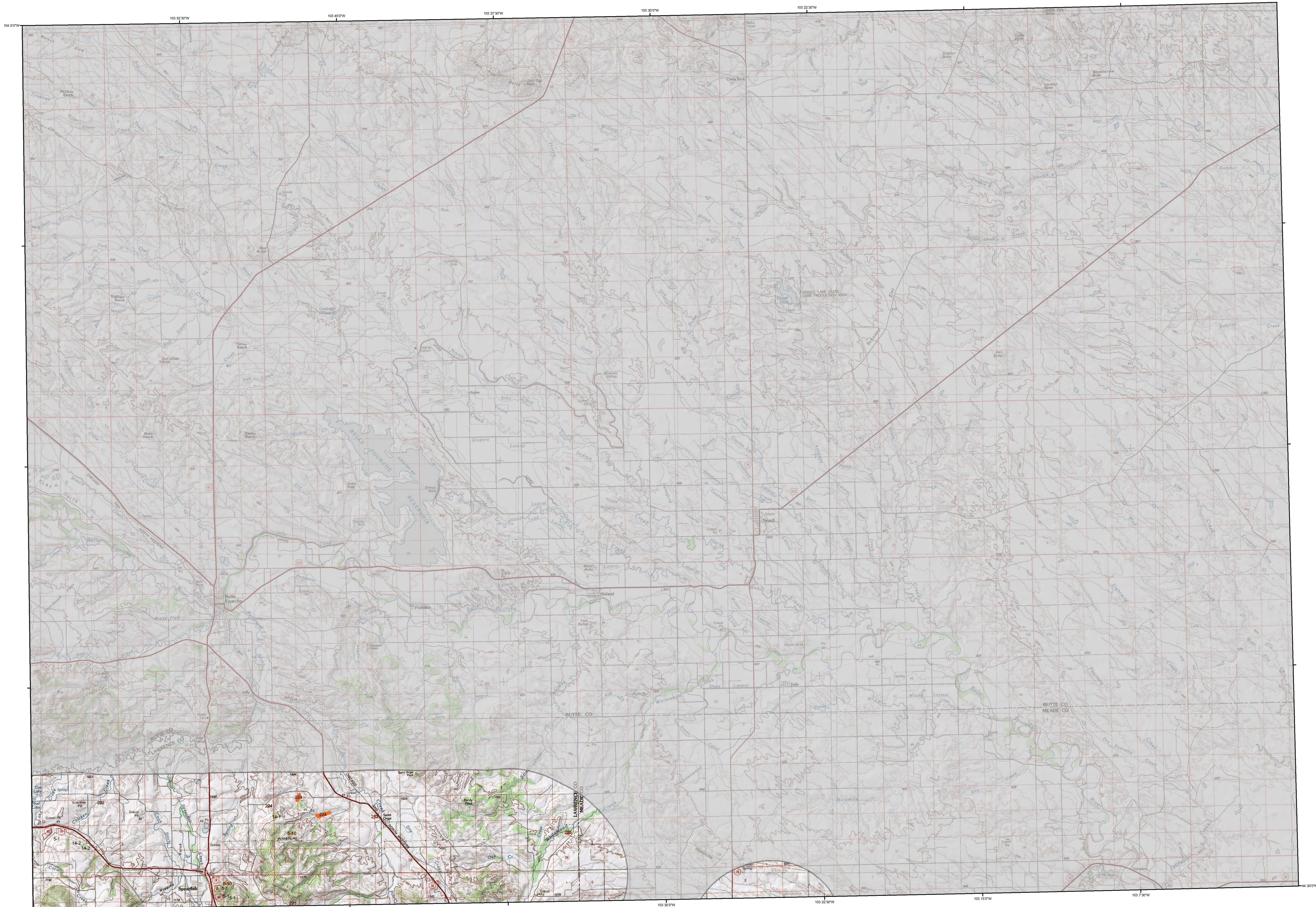


2006 Aerial Insect and Disease Survey

Belle Fourche, South Dakota

USGS 100K DRG: 44103-E1



1:100,000

Legend

Causal Agent(s) Not Flown in 2006

Use of the Number System
Example: 5-25 = The first number before the dash is the causal agent code. The number after the dash is the number of dead "fader" trees in the polygon or point. When recent dead trees are not counted, an intensity code of L-light, M-moderate, and H-high may be used after the causal agent code. Periodically, trees per acreage estimates are used after the causal agent code instead of number of dead "fader" trees (or an intensity code). For example: 5-122A = The first number before the dash is the causal agent code. The number after the dash is an estimation of the number of dead "fader" trees in the polygon per acre. In this case it would be an estimation that, on the average, one tree per every two acres would be a dead "fader" tree. In another example: 5-5A = that on the average, an estimated three trees per acre are dead "fader" trees. A . is used as a separator when a point/polygon has more than one causal agent code.

Code	Causal Agent	Primary Host	Code	Causal Agent	Primary Host
1	Douglas fir beetle	Douglas fir	49	Anthracnose	Lodgepole Pine
2	Engelmann spruce beetle	Engelmann spruce	50	White pine blister rust	5-Needle Pine
3	Mountain pine beetle	Ponderosa Pine	51	Dwarf mistletoe	Softwoods
4	Mountain pine beetle	Lodgepole Pine	52	Elysiptoma	Ponderosa Pine
5	Western pine beetle	5-Needle Pine	53	Inclusio #55, 56 & 58	All Tree Species
6	Western pine beetle	Ponderosa Pine	54	Air pollutants	All Tree Species
7	Fire engraver	White Fir	55	Chemical damage	All Tree Species
8	Douglas fir engraver beetle	Douglas fir	56	Lophodermium pinastri	Softwoods
9	Fire engraver	Subsaligne Fir	57	Rhabdocline pseudotsugae	Douglas fir
10	Western balsam bark beetle	Softwoods	58	Unidentified disease	Softwoods
11	Unidentified bark beetle	Lodgepole Pine	59	Winter damage light	All Tree Species
12	Pine engraver	Ponderosa Pine	60	Winter damage medium	All Tree Species
13	Pine engraver	Lodgepole Pine	61	Winter damage heavy	All Tree Species
14	Pine engraver	Ponderosa Pine	62	Diploids	Common Piñon
15	Ponderosa pine needle miner	Lodgepole Pine	63	Pyron black stain	Ponderosa Pine
16	Lodgepole pine needle miner	Ponderosa Pine	64	Fire	Hardwoods
17	Jack pine budworm	Jack Pine	65	Parasitism	All Tree Species
18	Spruce budworm, light defol.	Douglas fir	66	Windthrow	All Tree Species
19	Spruce budworm, medium defol.	Douglas fir	67	High water damage	All Tree Species
20	Spruce budworm, heavy defol.	Douglas fir	68	Avalanche	All Tree Species
21	Douglas fir tussock moth	Ponderosa Pine	69	Aspen decline-multiple agents	Quaking Aspen
22	Pine butterfly	Ponderosa Pine	70	Pyron pine mortality	Common Piñon
23	Pine looper	Hardwoods	71	Juniper mortality-unknown agents	Juniper
24	Pine tortrix	Hardwoods	72	Quercus oak decline-unknown agents	Quercus Oak
25	Tent caterpillars	Hardwoods	73	Lumber pine decline-multiple agents	Lumber Pine
26	Leaf beetles	Hardwoods	74	Hail damage	All Tree Species
27	Oak leaf roller	Ponderosa Pine	75	Unknown polygon	Common Piñon
28	Pine needle-sheath miner	Ponderosa Pine	76	Old pinon mortality	Lodgepole Pine
29	Pine tussock moth	Ponderosa Pine	77	Dutch elm disease	Elm
30	Carpenorhynchus	Softwoods	78	Unidentified defolator (softwood)	Ponderosa Pine
31	Variable oak leaf caterpillar	Hardwoods	79	Unidentified defolator (hardwood)	Hardwoods
32	Unidentified defolator	All Tree Species	80	Mortality (pine)	Pine
33	Heterobasidion annosum (Fomes annosus)	Softwoods			
34	Amillaria obtusata (Amillaria melia)	Softwoods			
35	Polyporus schweinitzii	Softwoods			
36	Phomopsis	All Tree Species			
37	Cytospora	Unknown			
38	Western gall rust	Unknown			
39	Comandra rust	Unknown			
40	Stalactiform rust	Lodgepole Pine			

USGS 100K Quad - Location Map



Legend
 Flow Area in 2006
 State Boundaries
 Counties

How Aerial Surveys Are Conducted

Data represented on this map are based on aerial observations manually recorded onto a map. This procedure is considered both an art form and a form of scientific data collection, and is highly subjective. An observer only has a few seconds to recognize the color difference between healthy and damaged trees of different species; diagnose causal agents correctly; estimate intensity; delineate the extent of damage; and precisely record this information on a georeferenced map. Air turbulence, cloud shadows, distance from aircraft, haze, smoke, and observer experience can all affect the quality of the survey. These data summaries provide an estimate of conditions on the ground and may differ from estimates derived by other methods.

Aerial surveys provide information on the current status for many causal agents, and are important when examining insect activity trends by comparing historical and current survey data over large areas.

Overview surveys are a snap shot in time and therefore may not be timed to accurately capture the true extent or severity of a particular disturbance activity. Aerial surveys can be thought of as the first stage in a multi-stage sampling design. Other remote sensing approaches, including aerial photography, electro-optical sensors, and specially designed aerial surveys with modified flight patterns, can be used to more accurately delineate the extent and severity of a particular disturbance agent. The preceding methods are often more costly than overview surveys, and are generally reserved to address situations of sufficient environmental, economic, or political importance.

Area surveyed by Bill Schaupp & Al Dymerski 08/21 - 08/24 2006

Map Created: 01/17/2007

Projection: UTM NAD83 Zone 13

Author: J. Ross, USDA Forest Service

DIRECT ALL INQUIRIES TO:



Resource Conservation and Forestry Division
3305 1/2 West South Street
Rapid City, SD 57702 - 8160

USDA Forest Service, Region 2
Renewable Resources
Forest Health Management
PO Box 25127
Lakewood, Colorado 80225

****DISCLAIMER****
Due to the nature of aerial surveys, the data on this map will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented on this map because these agents are not detectable from aerial surveys. The data presented on this map should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and causal agent. Shaded areas show locations where tree mortality or defoliation were apparent from the air. Intensity of damage is variable and not all trees in shaded areas are dead or defoliated.

The insect and disease data represented on this map are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using this map for purposes other than those for which it was intended may yield inaccurate or misleading results.

A data dictionary and digital copies of this map and the insect and disease data are available at: <http://www.fs.fed.us/r2/resources/fhm/aerialsurvey/>